

Application Note Application Note

Document No.: AN1086

APM32F4xx_ISP Application Note

Version: V1.0

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1 Introduction

This application note provides how to use the graphical interface programs Geehy-ISP MultiPort Programmer and Geehy-DFU Programmer for ISP online upgrade of firmware on APM32F4xx series.

Geehy-ISP MultiPort Programmer application program is used to perform reading, writing, erasing and other operations on single or multiple MCU devices, based on USART communication protocol.

Geehy-DFU Programmer application program is used to perform reading, writing, erasing and other operations on a single MCU device, based on USB communication protocol.

All application programs involved in this application note can be obtained and downloaded from the website of <u>www.geehy.com</u>.



Contents

1	Introduction	1
2	ISP MultiPort Programmer	3
2.1	Environmental requirements	3
2.2	Hardware connection	4
2.3	Device operation	6
2.4	Function operation	9
3	DFU Programmer	19
3.1	Environmental requirements	19
3.2	Device operation	20
3.3	Function operation	26
4	Revision History	31



2 ISP MultiPort Programmer

ISP is In-System-Programming. Chips with ISP function can write or erase programs directly on the circuit board through a simple download cable, can be rewritten by the software of the upper computer through the serial port, and supports online debugging. So that users can test and develop the chips without programmers. This brief summary will use APM32F407IGMINIBOARD to demonstrate the application function of Geehy-ISP MultiPort Programmer.

2.1 Environmental requirements

2.1.1 Software requirements

Support of Windows XP, Windows7 and above operating system is required.

Support of .net Framework4.0 is required.

2.1.2 Hardware requirements

Available serial communication port (COM).

When connecting multiple devices at the same time, please use the data cable, USB Hub and USB-to-

serial port device which can ensure stable transmission.

When connecting multiple devices, please select the appropriate number of devices according to the actual configuration of the PC.





2.2 Hardware connection

2.2.1 Connection method

Geehy-ISP Multiport Programmer supports the operation of connecting one device and connecting multiple devices at the same time. The equipment is connected as follows:

1) UART connects to one device, as shown in the following figure:



Figure 1 Method of Connecting One Device

2) UART connects to multiple devices at the same time, as shown in the figure below:



Figure 2 Method of Connecting Multiple Devices



2.2.2 Boot mode

APM32F4xx series provides three boot modes, which can be selected by users through the BOOT pin. The pin status will be latched on the rising edge of the fourth system clock after reset. Select the system memory to boot when using ISP.

BOOT1	BOOT0	Boot mode
x	0	Main FLASH memory
0	1	System memory
1	1	SRAM

2.2.3 Communication interface

The user realizes communication and connection through USART1 pin.

Serial port	TX Pin (transmit)	RX Pin (receive)
USART1	PA9	PA10



2.3 Device operation

2.3.1 Main interface

The main interface of Geehy-ISP Multi_Port Programmer is divided into four parts, as shown in the following figure:

🙆 Geeh	y ISP Multip	ort Pro	ogra	mmer						_		×
: File	Help Wind	dows	0	peration	Help	Language						1
+ S	🚰 😳 💽	0										
DeviceIn	fo	1	_							-		д
Product	Setting	COM		Bandrate	Timeout	Chip		PID	FW Ver	Progress		
0	Disconnect	COW8	Ľ	115200	2	AFM32F4_High=d	🚩	0413	1.1		0%0	
												2
												~
Proa												• × -
Write	Read											3
	se Setting	s	0	Mass ara		Pogo arosa	Stor	+500+1		RedSout		
	are arage ri	auc	0	mass era		Jrage erase	DLar	LDECL		LIUSeci	¥	
- Dow	nload File											
Start	Addr OX 80000	000	E:\v	vorkspace)	APM32F407	\GPIO_Toggle.bi	n				Select	
- Tri	te Option]	Byte							Opti	on bytes-		
RDI	n I	ST_STD	BY	BORL	VIL.				Addr Ov1F	ress FFFCOOO·	[31:0] 550044FF	
		2.00			- m				Ov1F	FFFC008	0000FFFF	
⊻ nr.	SI_SIUP 🗹 WI	JG_511		MALIN	71				OATI		00001111	
Dow	nLoad Setti	ings -										
🗌 Jw	np to the use	er prog	gram			Ver	ify					
		Stop							Execu	ıte		
Execute	Result											д
The oper	ation name							Resul	lt			4

Figure 3 Main Interface



1. Menu bar and toolbar:

1) The functions of the menu bar are as follows:

File: contains "Exit", and its function is to exit the program.

View: contains "Toolbar", and its function is to show / hide the toolbar.

Window: contains "New window", "Refresh serial port" and "Close all",

Their functions are to create a new device operation window, refresh the device connection serial port, and close all device operation windows respectively.

Operation: contains "Connect all", "Disconnect all", "Execute all" and "Abort all"

Their functions are to connect / disconnect all devices and run / stop all devices respectively.

Help: contains "Instructions for use" and "About". Their functions are to open the manual and view the software information respectively.

Language selection: contains "English" and "Chinese", and its function is to switch the interface language.

2) The functions of the buttons in the toolbar are: "New window", "Refresh serial port", "Connect all", "Disconnect all", "Execute all" and "Abort all" respectively.

2. Device control information display area: This area is used to set the device connection configuration and device information display.

3. Device operation configuration area: This area is used to set some operation configurations for the device.

4. Operation result display area: This area displays the execution of device operation.



2.3.2 Device connection

- 1) Click "New window" button to create a new operation window.
- 2) Select serial port number and baud rate. The minimum baud rate is 1200 bit/s, and the maximum baud rate is 115200 bit/s; set the timeout (1 ≤ timeout ≤ 10) in "s".
- 3) Connect: Reset MCU; click "Connect" to open the serial port and complete handshake with MCU. After handshaking successfully, the MCU information obtained is as follows:



Figure 4 Chip Reading

4) If the handshake with MCU fails, the following prompt will appear:



Figure5 Connection Failure Prompt



2.4 Function operation

2.4.1 Erase operation

1) Erase all space

🙆 Geeh	y ISP Multi	port Pro	grammer						—		×
File	Help Wi	ndows	Operation	Help	Language						
i 🕂 😂 i	🚰 🔕 I (00									
DeviceInf	o										д
Product	Setting	COM	Bandrate	Timeout	Chip	_	PID	FW Ver	Progress		
0	Disconnec	t COM8	✓ 115200	2	APM32F4_High-d	. 🗠	0413	1.1		100%	
Produ	ict:0										▼ ×
Write	Read										
Era:	se Settin	.gs	Mass ares	. (Paga arasa	C.L.	+9+.	. 0 🔺	Te de cat		
	ase usage	space	C mass eras			Star	LSecto	- -	LIUSeci	¥	
_ Down	aload Fil	e									
Start /	ddr OX 800	0000	E:\workspace\A	PM32F407	\GPIO_Toggle.bin					Select	
- Tri	te Option	Byte						Opti	on bytes-		
RDP		nRST_STD	BY BORLVI	Ĺ				Adda Ow13	ress ZRRRCOOO·	[31:0]	2
		-		71				013	TTTCOOD.	OOOOFFEE	
nks	1_510r	MDG-2M	MWPKU.	L				OATI		00001111	
- Down	aLoad Set	tings -									
🗌 Jun	p to the u	ser prog	ram		Verify	У					
		Stop						Execu	ıte		
Execute R	esult										П
The opera	ation name						Resul	.t			
2023/1/29	9 17:38:06	Product	:0 Mass eras	e			Succe	22	1		
									-		

Figure 6 Erase All Space



2) Erase specified space: Set the start page and end page to be erased

🔞 Geehy ISP Multiport Programmer	– 🗆 ×
File Help Windows Operation Help Lang	Juage
i 🕂 📚 i 🔛 🔕 i 🕥 🔾	
DeviceInfo	д
Product Setting COM Bandrate Timeout Chi	PID FW Ver Progress
0 Disconnect COM8 ~ 115200 ~ 2 APM3	2F4_High-d 🗡 0413 1.1
Product:0	• X
Write Read	
Erase Settings	
O Erase usage space O Mass erase	;e erase StartSector U 🔽 EndSector II 👻
Download File	
Start Addr OX 8000000 E:\workspace\APM32F407\GPIC	_Toggle.bin Select
Trite Option Byte	Option bytes
RDP DRST STDBY BORLVL	Address [31:0]
	UXITTITCUUU. SSITAAES
nRST_STOP WDG_SW MWPROT	UxifffC008: 0000ffff
DownLoad Settings	
Jump to the user program	Verify
Stop	Execute
Execute Result	
The operation name	Result
2023/1/29 17:38:06 Product:0 Mass erase	Success
2023/1/29 17:39:32 Product:0 Page erase	Success

Figure 7 Erase Specified Space



2.4.2 Write option byte

1) After selecting "Write option byte", the current option type configuration of MCU will be obtained,

as shown in the figure:

🙆 Geeh	y ISP Mult	iport Pro	ogrammer						_		×
: File	Help W	indows	Operation	Help	Language						
:+ 🕄	🚰 🔕	00									-
DeviceInf	o						_				Д
Product	Setting	COM	Bandrate	Timeout	Chip		PID	FW Ver	Progress		
0	Disconnec	t COM8	✓ 115200	2	APM32F4_High-d	···· 🚩	0413	1.1		100%	
Produ	uct:0										• ×
Write	Read										
🗌 Er a	se Settin	lgs									_
🔘 Er	ase usage	space	🔘 Mass eras	e (🔵 Page erase	Star	tSecto	r 0 🛔	EndSect	or 11 🛓	
- Dow:	nload Fil	e									
Start	Addr OX 800	00000	E:\workspace\#	PM32F407	\GPIO_Toggle.bi	n				Select	
Tri	te Option	. Byte						Opti	on bytes		
🗌 RDF		nRST_STD	IBY 🔽 BORLVI	L				Addı Ox11	ress FFFFC000:	[31:0] 5500AAFF	
🗹 nRS	T_STOP 🗹	WDG_SW	MWPRO	r				Ox11	FFFFC008:	0000FFFF	
Dow	nLoad Sei	tings -									
Ju	p to the v	iser prog	gr am		Veri	fy					
				_	1						
		Stop						Exect	ıte		
Execute F	Result										Д
The oper:	ation name						Resul	.t			
2023/1/29	9 17:44:12	Product	t:O Write Opt	ion Byte			Succe	22			

Figure 8 Write Option Byte



2.4.3 Read option byte

🙆 Geeh	y ISP Multip	ort Progr	ammer					_		×
: File	Help Win	dows (Operation	Help	Language					
+ S	1 🗱 🔕 I 💽	0								
DeviceIn	fo									Д
Product	Setting	COM	Bandrate	Timeout	Chip	PID	FW Ver	Progres	100%	
0	Disconnect		115200 🗠	2	APM32F4_High-d.	 0413	1.1		100%	
Prod	uct:0					 				• X
Write	Read									
Re:	adout File									
								Save P	ath	
🗹 Rea	ad Option B	yte				0	ption by	/tes		
_	_						Addres	z	[31:0]	
	DP 🗹	nRST_STD	ВҰ				Ox1FFFF(:000: 5	500AAFF	
	RST STOR L						Ox1FFFF(.008: (OOOFFFF	
V 10	l⊡1_5101 [⊻]	NDG_2N								
			-							
E BI	UKLVL	M NWPRU	T							
		Stop					Free	1+0		
		Drop					- Exect			
Execute F	Result									д
The oper	ation name					Resul	Lt			
2023/1/2	9 17:49:59	Product:O	Write Opt	ion Byte		Succe	22			
2023/1/2	9 17:50:28	Product:0	Read Opti	on Byte		Succe	22			

Figure 9 Read Option Byte



2.4.4 Write to file

After selecting "Write to file", you can also select the followings:

- > Erase method: Select "Erase use space" or "Erase all space".
- Post-write operation: "Verify after download" means that, after all file data are written to MCU, read the MCU data of the same length from the start address for data check, and judge whether the data written to MCU are correct; "Execute program after download" starts the program written to MCU.
- > Note: When the file suffix is ".hex", the start address cannot be edited.
- Note: After starting the program written to MCU, the communication between the upper computer and the system memory bootloader will be lost, and the MCU needs to be reconnected.



Document No.: AN1086

-											
😳 Gee	hy ISP Mult	iport Progr	ammer								\times
: File	Help W	indows (Operation	Help	Language						
i 🕂 😭	i 👫 🙆 i	00									
DeviceIr	nfo										д
Product	Setting	COM	Bandrate	Timeout	Chip		PID H	7W Ver	Progress		
0	Connect	coms 🗸	115200 🗸	2	APM32F4_High=d	~	0413	1.1	_	100%	
Dur	lu atro										- ~
Proc	uct:0										• •
Write	Read										
Er:	ase Settii	1gs									
• E	lrase usage	space () Mass eras	e (🔵 Page erase	Star	tSector	0 🌲	EndSect	or 11 📫	
	11 2:1								_		
-V D01	rnload Fil	Le									
Start	Addr OX 80	D0000 E:\	workspace\/	APM32F407	\GPIO_Toggle.bi	n				Select	
	ite Option	Product:0								×	
	<u>F</u>									:0]	
RI	DP 🗹	_								DAAFE	1
- T	ST STOP		Downloadin	g successf	fully,to continue	operatio	n,please	connec	t MCU.	DFFFF	
V 10	DI_DIOI [V]										
Dog	rnLoad Set										
	imp to the 1								确定		
			_	_			_				
		Stop						Execu	ite		
Evecuto	Recul+										D
The open	ration name						Result				
2023/1/2	29 17:53:21	Product:0	Erase usa	ge space			Success	5			
2023/1/2	29 17:53:37	Product:0	Download	File			Success	5			
2023/1/2	29 17:53:51	Product:0	Verify				Success	5			
2023/1/2	29 17:53:51	Product:0	Jump to t	he user p	pr		Success	5			

Figure 10 Write to File



2.4.5 Read a file

🙆 Geeh	y ISP Mult	iport Pro	ogrammer						_		×
: File	Help W	indows	Operation	Help	Language						
+ 🏻	🚰 😮	00									
DeviceInf	0							_			д
Product	Setting	COM	Bandrate	Timeout	Chip		PID	FW Ver	Progre	229	
0	Disconne	t COM8	✓ 115200	2	APM32F4_High-d.	🗡	0413	1.1		11%	
Dred	unter O										- ~
Produ	Read										• ^
Write	neau										
<u> </u>	dout Fil	e									
E:\wor	-kspace\AP	M32F407\]	Read_GPIO_Togg	le.bin					Save	Path	
	1 0-1:	B+-						Dation be	rtor		
res		byte –						Addres	s	[31:0]	
	DP	nRST_S	STDBY					Ox1FFFF(.000:	5500AAFF	
								018888	-000	OOODEEEEE	
/ 제	RST_STOP	VDG_SV	ł					OXIFFFF	.000.	00007777	
🗹 ВС	RLVL	🔽 NW	PROT								
		Stop						Exect	ıte		
Execute F	(esult						Rossi	1+			4
The opers	ation name						nesu				

Figure 11 Reading a File



Document No.: AN1086

🙆 Geeh	y ISP Multi	port Pro	grammer						_			×
: File	Help Wi	ndows	Operation	Help	Language							
i 🕂 😂	🚰 🔕 (00										
DeviceInf	fo											Д
Product	Setting	COM	Bandrate	Timeout	Chip		PID	FW Ver	Progr	ess		
0	Disconnec	t COM8	✓ 115200	2	APM32F4_High-d	🚩	0413	1.1		1009	8 6	
Produ	uct:0											• X
Write	Read											
🖂 Rea	adout Fil	e										
E:\wor	rkspace\APN	32F407\R	ead_GPIO_Toggl	le.bin					Save	Path		
Rea	ad Option	Byte —					-01	tion by	/tes			
🗌 RI	DP -] nRST_S	TDBY				C	Addres)x1FFFF(s 2000 :	[31:0 5500AA] FF	
🗹 nl	RST_STOP	∕ WDG_SW					0)x1FFFF(:008	0000FF	FF	
⊠ BO	ORLVL	VWF	ROT									
		Stop						Execu	ıte			
Execute F	Result											ą
The oper:	ation name						Resul	t				
2023/1/29	9 18:11:59	Product	::0 Readout F:	ile			Succes	:5				

Figure 12 Read a File



2.4.6 Execute and abort

1) Execute: After the configuration operation, click "Execute" (or click "Execute all" button on the toolbar) to start communicating with MCU to complete the function selected by the user.

Stop	
------	--

- Abort: Enable "Abort" (or click "Abort all" button on the toolbar) after starting execution. The following takes "Read a file" as an example to introduce the abort function.
- 3) Note: After aborting, the operation will fail.



Document No.: AN1086

🙆 Geel	v ISP Multi	oort Prog	rammer					_		×
Eile	Help Wi	ndows	Operation	Help	Language					
5 .			operation	neip	Language					
DeviceInt	🖬 👾 🌂									п
Product	Setting	COM	Bandrate	Timeout	Chip	PID	FW Ver	Progre	55	7
0	Disconnect		115200 ~	2	APM32F4 High-d	✓ 0413	1.1		7%	
Prod	uct:0									• ×
Write	Read									
	adout File									
E:\wor	rkspace\APM	32 F4 07\Re	ad GPIO Togg	le bin				Save P	ath	
		,								
- Rea	ad Option	Byte	_			0	ntion h	rtes		
	_	-	Geehy	-ISP			×		[31:0]	
🗌 R	DP 🖂] nRST_STI)BY					0: 9	5500AAFF	
				Whe	ther to abord the cur	rent operat	ion.)8: (
🗹 n	RST_STOP	WDG_SW		· ·						
🖂 В	ORLVL	🖂 NWPR	OT		是(Y)	否()	(V			
							-			
				_						
		Stop					Execu	ıte		
Execute F	Result									џ
The oper	ation name					Resul	.t			

Figure 13 Abort Operation



3 DFU Programmer

The full name of DFU is Device Firmware Upgrade. It mainly supports USB BootLoader, and can implement programming of chip FLASH and modification of option bytes. The function of the software is basically similar to that of APM32 ISP Multiport Programmer, except that it uses USB to upgrade the software of MCU device. This brief summary will use APM32F407IGMINIBOARD to demonstrate the application function of DFU Programmer.

3.1 Environmental requirements

3.1.1 Software requirements

Support of Windows XP, Windows7 and above operating system is required.

Support of .net Framework4.0 is required.

3.1.2 Hardware requirements

Support Type-B, Mini-B, Micro-B and other USB interface types.



3.2 Device operation

3.2.1 Main interface

The main interface of DFU Programmer is divided into four parts, as shown in the following figure:

DFU Programmer V1.0	0.1		א* ⊡ ×
DFU Programmer V1.0	2.Device area Port: PID: 3.Information area Device: Flash Size: Factory: Type: Log I 	VID: Connect Sea Product ID: Version: Serial Number: Size:	rch
	4.Result area		E.

Figure 14 Main Interface

- 1. Function area: This area displays the application functions of the device.
- 2. Device area: This area displays the device information and status.
- 3. Information area: This area displays the basic information of device connection.
- 4. **Result area:** This area displays the execution of device operation.



3.2.2 Driver installation

1) The administrator opens cmd and enters bcdedit /set testsigning on



2) Insert the device into the computer and check the device manager:

🚔 Device Manager		×
File Action View Help		
Ibh-PC Batteries Bluetooth Radios Disk drives Display adapters DVD/CD-ROM drives Human Interface Devices IDE ATA/ATAPI controllers Keyboards Mice and other pointing devices Network adapters Network adapters Other devices		
Processors		
Sound, video and game controllers		
System devices		
Universal Serial Bus controllers		



3) Select [Update driver]:





4) Select [Display all devices] next:

		×
🚱 🧵 Update Driver Software - A	PM32 ISP DFU mode	·
Select the device driver yo	u want to install for this l	hardware.
Select the manufacturer a have a disk that contains	nd model of your hardware device the driver you want to install, clice	e and then click Next. If you k Have Disk.
Manufacturer	Model	
%StdMfg% (Enhanced Storage Device) (Generic USB Audio) (Generic USB Hub)	₩ StausbGD.DeviceDesc.Gene	ric%
This driver is digitally signed.		Have Disk
Tell me why driver signing is i	mportant	
		Next Cancel
🕞 🧵 Update Driver Software - A	PM32 ISP DFU mode	×
Select the device driver yo	ou want to install for this	hardware.
Select the manufacturer a	and model of your hardware devi	ce and then click Next. If you
Install From Disk		×
Insert the manufi make sure that t	acturer's installation disk, and then he correct drive is selected below.	OK Cancel
Manu <mark>%Std?</mark> (Enhai		
(Gene Copy manufactu	rer's files from:	
All All	•	Browse
This driver is digitally signed.		Have Disk
Tell me why driver signing is	mportant	
		Next Cancel



5) Select "APM32DfuDriver.inf" driver file:

			83
ه 🕞	Update Driver S	oftware - APM32 ISP DFU mode	
Select	the device of Select the mar Install From Dis Locate File Look in:	driver you want to install for this hardware. hufacturer and model of your hardware device and then click k APM32DfuDriver APM32DfuDriver APM32DfuDriver	Next. If you
Manu <mark> %StdP</mark> (Enhar (Gene (Gene	APM32Df	uDriver	
🟹 Thi	•	III	, sk
Tel	File name:	APM32DfuDriver.inf Open	
	Files of type:	Setup Information (*.inf)	Cancel
			×

🚱 🧵 Update Driver Software - APM32 ISP DFU mode	
Select the device driver you want to install for this har Select the manufacturer and model of your hardware device a	dware. nd then click Next. If you
have a disk that contains the driver you want to install, click H	ave Disk.
Show compatible hardware	
APM32 Bootloader	
This driver is digitally signed.	Have Disk
Tell me why driver signing is important	
	Next Cancel



6) Select [Close] to complete the update of the driver:





3.3 Function operation

3.3.1 Connect devices

- 1) According to the device details, select the corresponding device and click [Connect a device] button.
- 2) When a new device is added, click [Disconnect a device], and then click [Search device] button to find the device and reconnect.

DFU Programmer V1.0					≁ Ū ×
DFU Programmer V1.0 1.Select connect a deve	.1 ice 2. Select th Port: USB1 4.View device de Device: Flash Size: Factory: Type: Log	PID: 0x106 PID: 0	ce 3.Click co VID: 0x314B Conn Product ID: Version: Serial Number: Size:	0x106 2.0 653331F98650 64	

Figure 15 Connect a Device



3.3.2 Read a chip

- 1) Fill in the star address of chip reading and the size of read data. Click [Read a chip], and the list will display the corresponding read data. There are three data display formats: 8 bits, 16 bits and 32 bits. Click the single choice button to switch.
- 2) Click [Save data] button to save the read data locally.

Start address: 0x08000000 Size: 0x400 🛱 Save 🔘 8 bit 🔘 16 bit 🔘 32 bit 88 Language Address 0 4 8 С ASSCII 🖉 Connect 0X0800000 FFFFFFF FFFFFFF FFFFFFF FFFFFFF ↑ Read 0X08000010 FFFFFFF FFFFFFF FFFFFFF FFFFFFF \pm Update 0X08000020 FFFFFFF FFFFFFF FFFFFFF FFFFFFF 0X08000030 FFFFFFF FFFFFFF FFFFFFF FFFFFFF Option Bytes FFFFFFF FFFFFFF FFFFFFF FFFFFFF 0X08000040 Erasing 0X08000050 FFFFFFF FFFFFFF FFFFFFF FFFFFFF B User Manual 0X08000060 FFFFFFF FFFFFFF FFFFFFF FFFFFFF 0X08000070 FFFFFFF FFFFFFF FFFFFFF FFFFFFF Log

[2023-01-30 16:19:14.2531] INFO Search device complete. [2023-01-30 16:19:18.8086] INFO Connect the device successfully. [2023-01-30 16:19:26.2171] INFO Success!

Figure 16 Read a Chip

<u>h</u>



3.3.3 Firmware upgrade

- 1) Select the bin file to be written, select the start address of data writing, select the configuration condition, and click Start to update the firmware.
- 2) Write after erasing the chip: The corresponding sector data will be erased.
- 3) Run after writing: The program will run after writing, and the chip needs to be manually reset and reconnected.

DFU Programmer V1.0	0.1	,∗ ⊡ ×
 ☆ Language ở Connect ☆ Read ☆ Update ☑ Option Bytes ☆ Erasing ☆ User Manual 	File path: E:\workspace\APM32F407\GPIO_Toggle.bin Start address: 0x08000000 If lash erase before updating the firmware Verify programming Run after updating the firmware	Select a file
	Log [2023-01-30 16:22:24.7522] INFO Firmware update complete.	L L

Figure 17 Firmware Upgrade



3.3.4 Option byte

- 1) [Read] button is used to read the latest option byte configuration.
- 2) [Application] button is used to write the latest modification to the chip.
- 3) [Cancel read protection] button is used to restore to the AA (unprotected) state.
- 4) [User configuration]: Hover the mouse over the option and you can see the detailed explanation.

Note: When in the read protection state, the user cannot [Read a chip], [Upgrade firmware] and [Erase chip].

DFU Programmer V1.	0.1	я ^к []							
 ☆ Language ⊘ Connect ① Read ↓ Update ☑ Option Bytes ☆ Erasing ☆ User Manual 	Read Out Protection Image: Constraint of the second se								
	Write Protection ✓ WRP0 ✓ WRP1 ✓ WRP2 ✓ WRP3 ✓ WRP4 ✓ WRP5 ✓ WRP6 ✓ WRP8 ✓ WRP9 ✓ WRP10 ✓ WRP11	WRP7							
	Log [2023-01-30 16:41:20.9445] INFO Search device complete. [2023-01-30 16:41:22.1752] INFO Connect the device successfully. [2023-01-30 16:41:30.8607] INFO Finish reading option bytes.	۲. ج							

Figure 18 Option Byte



3.3.5 Erase chip

- 1) [Search address] Enter the address in the search box, and then click Enter to quickly locate the range of the erased sector.
- 2) [Inverse] Quickly inversely select the address to be erased. The selected address will become unselected, and the unselected address will become selected.
- 3) [Erase selected] Check the sector to be erased to erase the sector.
- 4) [Erase all] Erase the entire Flash sector.

DFU Programmer V1.0).1							۲ D ×
	0x80000FF	Q	Inverse	Erase Selected	© Erase All			
吕 Language								
🖉 Connect	 0x8000000-0x80 0x8020000-0x80 	03FFF 3FFFF	✓ 0x80040 ✓ 0x80400	000-0x8007FFF 000-0x805FFFF	 0x8008000-0x800BFFF 0x8060000-0x807FFFF 	 0x800C000-0x800FFFF 0x8080000-0x809FFFF 	 0x8010000-0x801FFFF 0x80A0000-0x80BFFFF 	
1 Read	0x80C0000-0x80	DFFFF	0x80E00	000-0x80FFFFF				
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8 User Manual								
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	[2023-01-30 16:44:5	2.1468] IN	FO Success!					B
	[2023-01-30 16:45:0	3.4543] INF	FO Success!					Lun



4 Revision History

Table 1 Document Revision History

Date	Version	Change History
June 20, 2022	1.0	New



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